REMARKS

In the Office Action, currently-pending Claims 1-84 are rejected under 35 U.S.C. §102(e) over the reference of Nagayasu, et al., U.S. Patent Application Number 2003/0118197 and under §102(b) over Hauser, German Patent Number DT2628259. Both of those references are cited in §102(b) rejections. However, the Examiner does not give any specific analysis of the claims. Rather, the claims are rejected as being anticipated based upon the International Search Report dated November 8, 2004 from the corresponding PCT Application. Furthermore, the Examiner objected to a specific citation in the Information Disclosure Statement,

Information Disclosure Statement

The Examiner indicates that the patents listed on the Search Report were considered, but they will not be listed on the Patent resulting from the Application because they were not provided in a separate list in compliance with 37 C.F.R. 1.98(a)(1). However, Applicants note that in the Supplemental Information Disclosure Statement filed August 23, 2004, wherein the International Search Report was listed, all of the individual references set forth in the Search Report were also individually listed in the PTO 1449 Forms filed with the Information Disclosure Statement. Furthermore, that 1449 Form listing those references was returned initialed by the Examiner, and thus, those individual references should be listed on the patent.

Applicants further note that an earlier IDS was filed on February 8, 2004. However, in the most recent Office Action, the Examiner did not return the initial forms associated with that earlier IDS. Applicants respectfully request consideration of those documents and return of the initialled form indicating their consideration by the Examiner.

Section 102 Rejections.

As noted above, the Examiner has rejected the pending Claims 1-84 based upon the references of Nagayasu, et al.and Hauser, noting that the rejection is based on the same reasons as set forth in the International Search Report. However, the International Search Report was a cursory analysis of the cited art, and its applicability to the pending claims. In the further analysis of the cited art and the pending claims, it becomes very clear that the cited references do not at all teach the limitations that are set forth in the claims, and thus, those references cannot anticipate those claims under §102(e) or §102(b).

The present invention is directed to a headset, system, and method for selectively transmitting captured audio signals based on a preliminary determination that those audio signals contain user speech. Representations of the captured audio signals are selectively transmitted for further speech recognition processing. If user speech is not detected, the representations of the captured audio signals are not forwarded to another device, such as a device having speech recognition capabilities. In that way, needless

transmission of captured sound is avoided, thus prolonging the battery life of the headset as well as avoiding constant RF transmission from the head of a user to the remote device. Neither of the cited references of Nagayasu, et al. nor Hauser teaches a device having such capabilities, and neither of the references is concerned with needless sound transmission or constant RF transmission from the head of a user. In fact, both Nagayasu, et al. and Hauser teach away from the invention because they teach a constant transmission of captured sound from a headset. Furthermore, neither of those references teaches an initial or preliminary evaluation of captured audio signals to determine if speech is present, and then a selective transmission of the captured audio signals, based on the determination that user speech is detected in those audio signals.

Various of the claims have been amended to further clarify those claims. Several of the claims have been cancelled. Based upon any reasonable interpretation of the cited references of Nagayasu, et al. and Hauser, those references clearly do not teach all the elements cited in the current claims.

Turning to the Nagayasu, et al. reference, the Examiner cites three Nagayasu, et al. references in the PTO 892 Form attached with the Office Action. Those include U.S. Application Number 2003/0118197 and U.S. Patent No. 7,110,800, which is the issued Patent of the `197 Application. The third reference, 2005/0232436, is essentially a divisional of the `197 Application. Accordingly, all those references are essentially the same disclosure, and will be referred to as the Nagayasu, et al. application herein.

The Nagayasu, et al. application discloses a headset device which processes sound signals, including radio signals that include speech signals. Furthermore, one embodiment of the Nagayasu, et al. device has some speech recognition capabilities. However, despite the Nagayasu, et al. reference teaching some speech processing and also some speech recognition, that reference still does not teach the invention as recited in the pending claims.

Generally, the Nagayasu, et al. reference discloses a headset device that receives both speaking sounds, such as through short-range radio communications through a microphone, and also external sounds that are picked up by a second, sound detection microphone. The external sounds may contain some of the speech from the radio communication. The headset in the Nagayasu, et al. reference receives both the radio sounds and the external sounds and is configured for selectively adjusting the ratio of external sounds and the radio signals for use by the headset. That is, the Nagayasu, et al. reference teaches a headset that allows the user to adjust the ratio of speech to direct external sounds that it receives so that the wearer can emphasize or hear one of those sounds more than the other.

However, the Nagayasu, et al. headset makes no determination with respect to the actual content coming from either source (i.e. radio or external microphone) in order to determine if speech is actually in one of the signals. The Nagayasu, et al. reference assumes that some of the radio signals are speech radio signals, because they are coming from another speaker wearing a headset who is transmitting by radio to a second headset. However, the noises picked up

by the speaker's microphone and transmitted by radio might also be external noises that exist at the location of that speaker. The Nagayasu, et al., headset does not know the specific contents or information of either of the two signals, and, in fact, does not care. It transmits on the radio channel regardless of the content of the captured sounds. The radio communication is essentially continuous and is not at all selective based on the content of the captured audio signals that are sent over the radio link. Furthermore, the Nagayasu, et al. headset does not form sampled representations of the audio signals so that speech detection circuitry might initially be utilized with the sampled representations of the audio signals to determine that the audio signals include user's speech. Rather, the headset radios of Nagayasu, et al. just send the raw audio to the receiving radio to be played through a speaker in the traditional sense. Again, the Nagayasu, et al. headphone does not care what the noises are, it merely adjusts the ratio between two different noise or sound sources for a listener to hear one more than the other. Additionally, there is no teaching of selective transmission of the signals to a device for further speech recognition based on the preliminary speech detection analysis at the headset.

Accordingly, the Nagayasu, et al. reference does not in any way teach a headset that processes sampled representations of audio signals that are captured by the headset and uses speech detection circuitry to preliminarily determine that the audio signals do indeed include user's speech. Furthermore, the headset as set forth in the Nagayasu, et al. patent is constantly transmitting. It does not selectively transmit based on the

determination that user's speech is detected. Again, in the Nagayasu, et al. reference, the headset does not care about the content of the sounds and certainly makes no determination based upon the content of the audio signals in order to make a decision to transmit or not transmit those audio signals.

Even in the embodiment of the headset set forth in Nagayasu, et al. that has speech recognition capabilities, speech recognition is completed at one location (i.e., the headset), and only the actual end results, not sampled representations of the audio, are sent. In the present invention, the headset provides an initial speech detection to determine whether any further processing is necessary, and whether representations of the captured audio signal should be sent selectively to another device for completion of the speech processing or the back-end processing.

In the Nagayasu, et al. device, such an embodiment would require complete speech processing capability on a single headset. As noted in the background of the present Application, such a solution would not be currently practical and does not address power issues associated with the portable headset of the invention. As noted, the present invention provides a means for those workers in a voice-driven environment to receive voice instructions, ask questions, report the progress of their tasks, report working conditions, and otherwise collect data associated with their voice-driven work. As such, a headset must be constantly worn on the head throughout a work shift. Therefore, a heavy battery would be necessary for powering a full speech recognizer and voice synthesizer and such a configuration on a headset would

be impractical. Furthermore, in any operation of the Nagayasu, et al. headset, there is no selective transmission of representations of the captured audio signals or selective reduction of data transferred by the headset due to an initial or preliminary detection of speech signals within the captured audio signals. Accordingly, the Nagayasu, et al. reference does not anticipate the invention recited in the pending claims.

With respect to Hauser, we obtained an English translation of the Detailed Description portion of that reference (which is enclosed), and that reference also does not teach or render obvious the claimed invention.

Primarily, the intercom system of the Hauser reference is directed to conveying speech signals between speakers when there is a lot of background environmental noise, such as between a motorcycle driver and passenger. Specifically, the intercom system utilizes a diplexer which frequency divides, or frequency separates those signals that might be considered useful, such as in the typical speech band (e.g. 300 Hz – 3000 Hz), from out of the band noise. Therefore, based on frequency, the Hauser intercom system makes a determination that those signals between 300 Hz and 3000 Hz might be userful, and all other signals outside of that band might be noise. However, the intercom system of the Hauser reference only divides signals by frequency. It is not concerned with the information or the form of the signals in that frequency band. The Hauser device does not in any way process sampled representations of those audio signals using speech detection circuitry. in order to determine that the audio signals in one separate frequency band actually include user's speech.

The Hauser intercom system utilizes a diplexer to make the initial frequency division of signals. Therefore, it captures signals in the 300 Hz – 3000 Hz range and transmits those signals regardless of any content. The Hauser reference also realizes that additional noise may fall within the 300 Hz – 3000 Hz band. Since the Hauser intercom system does not have the ability to process and analyze the sampled representations of the audio system to detect speech, it must accept the noise that falls within the designated speaking band and transmit or send all signals, including noise, falling in the specific frequency band.

Furthermore, the Hauser intercom system is generally always transmitting the signals falling in the specific frequency band, and thus, does not selectively transmit sampled representations of the captured audio signals based on the determination that user's speech is detected as set forth in the currently-pending claims. If sounds are detected in the 300 Hz – 3000 Hz band, they will be transmitted, whatever levels of sound they are, even if they do not contain speech. Furthermore, what is constantly transmitted or sent in Hauser are raw audio signals for replay at a speaker. There is no processing of the audio, and there is no transmission of sampled representations of the audio signals taught in Hauser. Again, the Hauser reference is simply doing frequency segregation and is not processing sampled representations of the audio signals using speech detection circuitry in order to preliminarily determine that the audio signals actually include user's speech or selectively transmitting such representations based on that determination.

As such, the present invention is not taught or anticipated or rendered obvious by the Hauser reference.

Turning now to Claim 1, that claim recites a headset configured for processing sampled representations of audio signals captured by the headset, and using speech detection circuitry to determine that the audio signals include user speech. That is, a preliminary detection is made to determine whether those audio signals are merely non-useful sounds, or actual user speech from a user wearing the headset that should be further processed. Furthermore, Claim 1 recites that the headset is further configured for selectively transmitting sampled representations of the captured audio signals to a device based on the determination that user speech is actually detected in those audio signals. As noted above, the Nagayasu, et al. reference does not at all teach a headset with speech detection circuitry to determine that audio signals include user speech, and then to selectively transmit (or not transmit) representations of those captured audio signals based on the determination that user speech is detected. In the embodiments disclosed in Nagayasu, et al. the headset does not care what the content of the various audio signals is, rather it is just concerned with the ratio of those sound signals received by one source, with respect to the sound signals received by another source. Furthermore, even in the embodiment of Nagayasu, et al. discussing speech recognition, only the data results of the speech recognition are transmitted, not sampled representations of the captured audio signals for further processing. In fact, there would be no need for sampled representations of the captured audio signals in Nagayasu, et al.

because the speech recognition would already be complete. In the present invention, additional back-end speech processing is provided by another device, and thus, that device must receive sampled audio signals to process. Furthermore, even with the speech recognition capability of Nagayasu, et al., that headset is constantly transmitting something. There is no selective transmitting of sampled representations of the captured audio signals based on the determination that user speech is detected or not detected.

As noted above, the Hauser reference does not teach a headset configured to process sampled representations of audio signals using speech detection circuitry to determine that the audio signals include user speech. Furthermore, Hauser does not teach a headset that selectively transmits the sampled representations of the captured audio signals based on that determination that is made regarding the content of speech.

Accordingly, Independent Claim 1 cannot be anticipated by the Nagayasu, et al. or the Hauser reference under §102 because neither of those references teaches all of the specific elements recited in that claim as required under §102. As such, Claim 1 is allowable over that cited art.

Of the Dependent Claims 2-17, which depend from Claim 1, Claims 2-3, 6, and 16-17 are cancelled. The other dependent claims are allowable for the reasons cited above with respect to Claim 1 and are further allowable because each of those claims recites a unique combination of elements, which is not taught by either Nagayasu, et al. or Hauser. As such, those pending dependent are allowable as well.

Independent Claim 18 recites a headset with some similar limitations, as noted above, with respect to Claim 1. Specifically, the headset includes a microphone for receiving audio signals and also includes processing circuitry that is configured for analyzing sampled representations of the audio signals to detect if the sampled representations include user speech. Furthermore, Claim 18 recites circuitry configured for selectively transmitting the sampled representations of the audio signals to a device when user speech is detected, and generally not transmitting to a device when user speech is not detected.

As noted above, neither Nagayasu, et al. nor Hauser teaches a headset that analyzes sampled representations of audio signals to detect if they include user speech, and then selectively transmits those sampled representations when user speech is detected, and generally does not transmit when user speech is not detected. Again, the Nagayasu, et al. reference is primarily concerned with varying the ratio between two sound sources, such as external sounds and radio sounds to vary what a user hears through the headset. Hauser, on the other hand, merely frequency segregates signals, but still transmits all the raw audio in the frequency band, regardless of its content. As such, there is absolutely no teaching of the elements recited in Claim 18 directed to analyzing sampled representations of audio signals to determine if they include user speech and then selectively transmitting those sampled representations of the audio signals if user speech is detected and not transmitting and user speech is not detected. Even in the Nagayasu, et al. embodiment that utilizes speech recognition, the signals are essentially

processed through the speech recognition process at the headset. There is no initial analysis of sampled representations, nor is there a selective transmission based upon that initial analysis so that sampled representations would be transmitted when user speech is detected, but generally not transmitted when user speech is not detected. Accordingly, because the cited references do not teach all the elements recited in Claim 18, Claim 18 would not be anticipated under § 102 by the cited art, and thus, would be allowable. Depending Claims 19-27 depend from Claim 18, and thus, include all the limitations therein. Accordingly, those claims would also be in an allowable form for the reasons noted above. Those claims are further allowable because they recite a unique combination of elements not taught by the cited art.

Claim 28 has been canceled.

Claim 29 is an independent claim that recites a system for wireless communications that comprises a device configured for processing speech signals and a headset for capturing the audio signal to be processed. Claim 29 recites that the headset is configured for initially processing sampled representations of the captured audio signals using speech detection circuitry to determine if the audio signals include user's speech. Claim 29 also recites that the headset selectively wirelessly transmits, to the device, the sampled representations of the captured audio signals based on the determination that speech has been detected. For similar reasons as noted above with respect to Claims 1 and 18, cited references in Nagayasu, et al. or Hauser do not teach all the elements recited in Claim 29. For example, those references do not teach

a headset that initially processes sampled representations of captured audio signals to determine that those audio signals do indeed include user speech. Nor do those references teach selective wireless transmission of the sampled representations based on that determination. Rather, as noted above, the two references do not make any discrimination with respect to transmitting signals, but merely are primarily concerned with either varying the ratio between two noise sources, or simply making a frequency segregation of signals to try to eliminate some noise. Accordingly, Claim 29 is not anticipated by the cited references under §102, and is allowable over the cited art. Claims 30-44 are independent claims, which depend from Claim 29. Claim 34 has been cancelled. The remaining claims each recite the limitations set forth in Claim 29, and thus, would be allowable for that reason. Additionally, each of those claims recites a unique combination of elements and none of those combinations are taught by the cited references. Accordingly, those dependent claims are also in an allowable form.

Claim 45 is an independent method claim, including the limitations along the lines set forth in Claim 1. Specifically, the method comprises the steps of capturing audio signals and processing sampled representations of the audio signals using speech detection circuitry to determine if the audio signals include user speech. The method of Claim 45 further recites selectively transmitting sampled representations of the captured audio signals to a device based on the determination that user speech is detected. For the reasons discussed above with Claim 1 and other of the independent claims, the cited references of

Nagayasu, et al. or Hauser do not teach all of the elements set forth in Claim 45. Thus, Claim 45 is not anticipated by those references under §102, and is allowable. Dependent Claims 46-57 each depend from Claim 45, and thus, include the limitations therein, making those claims also allowable over the cited art. Furthermore, those claims recite unique methods, which are not anticipated by the cited art. Accordingly, those dependent claims are also in an allowable form.

Claim 58 is also an independent claim. That claim recites a headset for communication with a remote device. Claim 58 recites a headset with a microphone system configured to capture audio signals, including user speech and circuitry responsive to the output of the microphone system to detect user speech, and configured to reduce the amount of microphone system output data communicated to the remote device based on the user speech detection.

In one aspect of the present invention, the microphone system captures audio signals, and thus, relays those signals through the headset to be transmitted to a remote device. As noted above, in the cited art of Nagayasu, et al. or Hauser, the headsets transmit the signals they receive to other headsets without making any sort of analytical evaluation of those signals to detect user speech. For example, Nagayasu, et al. essentially deals with signals from two sources, and, depending upon a switch, will change the ratio of signals that are sent from one of those sources such that one source is the primary source. Hauser, on the other hand, merely utilizes a frequency filter, such as a diplexer, to divide out signals in a certain frequency range, which

may be of interest. It does not care about the content of those frequency signals, but rather sends everything that fits within the selective frequency band. The present invention, on the other hand, makes such a determination to see if the audio signals contain user speech that should be further processed. It does not merely transmit on those signals, regardless of their content. Rather, it will utilize the preliminary speech detection processing in order to make an evaluation, and, if the speech detection does not detect user speech, the headset does not transmit those captured audio signals. This evaluation thus, reduces the amount of microphone system output data that is communicated to the remote device. The other references, on the other hand, essentially send whatever is received by the selected microphone. Accordingly, the references in Nagayasu, et al. or Hauser do not teach all of the elements recited in Claim 58, and thus, do not anticipate Claim 58 under §102. Claim 58 is thus, allowable. Dependent Claims 59-71 each depend from Claim 58. Claim 66 has been cancelled. Accordingly, each of those dependent claims is also in an allowable form for the reasons noted above. Furthermore, each of those dependent claims is further allowable because it recites a unique combination of elements note anticipated by the cited references.

Claim 72 is also an independent claim and recites a headset for communication with a remote device that is capable of speech recognition processing. However, as noted above, the claimed headset does not automatically forward all captured audio signals for such further speech processing by a remote device. Rather, Claim 72 recites that the headset is

configured to sample the audio signals captured by the headset to make an initial detection of whether the captured audio signals include user speech. Furthermore, Claim 72 recites that the headset is operable to transmit to the device sampled representations of the captured audio signals for further speech recognition processing only when user speech is detected. Again, the non-discriminatory headsets of the cited art of Nagayasu, et al. or Hauser do not make an initial detection of whether the captured audio signals include user speech. Nor do they make a selective transmission of sample representations of the captured audio only when user speech is detected. Rather, they always send their captured signals, based only on those captured signals being within a certain frequency or switched between two sources, such as a speaker's microphone or an external microphone. Accordingly, the cited references do not teach all the elements recited in Claim 72, and thus, do not anticipate that claim. Claim 72 is thus, allowable. Dependent Claim 73 depends from Claim 72, and recites all the limitations therein. Thus, Claim 73 is allowable for that reason as well.

Claim 74 is an independent claim that recites a voice-driven speech recognition system that has distributed components comprising a microphone system, user speech digitizer, user speech detector, and back-end speech recognizer. Claim 74 recites that the system further comprises a headset that includes at least one of the microphone system and speech digitizer wherein the balance of the components may be contained in one or more devices located or removed from the headset. Claim 74 further recites that the headset

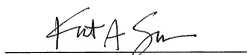
is configured for transmitting to the one or more devices, the output of the microphone system in the form of spectral representations of audio signals that are captured by the microphone system. That is, Claim 74 does not send on raw audio like the cited references of Nagayasu, et al. or Hauser, but rather transmits spectral representations of the audio signals for further back-end speech recognition. Claim 74 further recites that the headset includes a user speech detector, which is used to at least partially suppress from the transmitted output, the spectral representations of audio signals, which do not represent user speech. That is, as noted above, the present invention is directed to preliminarily evaluating the captured audio signals to determine if speech is present, and then selectively transmitting or selectively suppressing the transmission of spectral representations of the audio signals if speech is not present. Such elements are not at all taught by the cited references, and thus, Claim 74 is not anticipated by those references under §102, thus, making Claim 74 also allowable. Claims 75-84 all depend from Claim 74, and include the limitations therein. Thus, those claims would also not be anticipated by the references and would be allowable. Furthermore, each of those dependent claims recites a unique system, which is not anticipated by the cited art. Accordingly, those dependent claims are also in an allowable form.

Applicants submit that all of the pending claims are allowable and respectfully request an indication of their allowability at the Examiner's earliest convenience.

Applicants are submitting the fee due for the one-month extension of time with this response. If any additional fees are necessary, the Commissioner may consider this to be a request for such and charge any necessary fees to deposit account 23-3000.

Respectfully submitted,

WOOD, HERRON & EVANS, L.L.P.



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